

THE ALGERO-SPANISH TRIANGULATION

WE have received from Algeria further details as to the execution of the triangulation of the Algero-Spanish geodetic arc. The stations in the Algerian province of Oran are Msabia, a farm held by a colonist in the Mordzago at an altitude of 585 metres, and Mount Filhaoucen, at an altitude of 1,100 metres in Traras. These stations are at a distance of 108 kilometres from each other. The Spanish engineers have located themselves at Mulhacen, 3,500 metres altitude, in the Sierra Nevada, and Tetica, in the province of Murcia, 2,400 metres altitude. The distance from Tetica to Mulhacen is 88 kilometres. The two lines, Msabia-Tetica and Filhaoucen-Mulhacen, are respectively 270 and 300 kilometres long. In day-time signals were exchanged by sunlight and reflected by silvered glass mirrors 30 centimetres diameter; at night a Gramme electric machine was used in each station and worked by steam engine. The mirrors used for the electric light are 50 centimetres diameter. A telegraph line has been established from Oran to Msabia, a distance of 16 kilometres, so that Msabia is placed in direct communication with the European system. The temperature of the Spanish stations was very low, and fell several degrees under zero, while the heat was very great in the Algerian stations, which must be taken into account in the calculation of atmospheric refractions. Colonists and especially Arabs showed much surprise at seeing their mountains illuminated by a powerful ray of light which the French officers were sending from Filhaoucen and Msabia in the interval of operations. They were heard to say that the French had inherited the power of Allah, as they were making suns and stars.

THE IRON AND STEEL INSTITUTE

THE annual autumn or country meeting of this Association was held last week at Liverpool, in the concert room of St. George's Hall, the proceedings being opened with a few hearty words of welcome from the Mayor. The report of council showed that the Institution continued to flourish in spite of the hard times in the trade, fifty-eight new members having been added to the list on the last ballot and the proposal papers of thirty-eight received. The President then announced that the Council had accepted an invitation, numerous signed by representative firms in the iron trade of Westphalia to hold the autumn meeting of 1880 at Düsseldorf, which proposal was unanimously confirmed by the meeting.

After the completion of the formal business, the proceedings commenced with a discussion on the very useful method of determining manganese in iron ores, spiegel, ferromanganese, &c., by the volumetric method described by Mr. Pattinson, of Newcastle, at the last meeting in London, and which, according to the generally expressed opinion of chemists present, seems destined, for commercial purposes at any rate, to take the place of the more tedious analytical methods now in use.

Among the new communications prominence was given to a paper by M. A. Pourcel, of Terrenoire, on the causes of dephosphorisation of iron and steel, the principal idea in which was that the amount of phosphorus reduced from phosphates contained in iron ores depends mainly on the temperature and not on the reducing energy of the furnace temperature, instancing the fact that from the same ores pig-iron containing phosphorus in proportions varying from 1 to 3 might be obtained in the blast-furnace, according as the coke charge in the furnace was heavily burdened or not, a conclusion that did not find much favour among the members present.

A second paper on the neutralisation of phosphorus in iron and steel, by Mr. Richard Brown, of Ayr, proposed the addition of small doses of bichromate of potassium to the metal in the converter or melting furnace in order to introduce a small proportion of chromium into

the finished steel. According to the author's statement, metal with from 1 to 1½ per cent. of phosphorus may be made to show fair working qualities, when containing 0·1 to 0·2 per cent. of chromium as a corrective, but from the results of the tests produced in support it appeared to be extremely irregular, as regards extension under strain. In the discussion on this paper some interesting remarks were made incidentally by Mr. Riley on the working of a chromiferous pig iron, which was made to some extent in Tasmania, and from which great things were expected, but it had been found impracticable to produce clean iron from it in the puddling furnace, owing to the refractory character imparted by the chromium to the slag. Another paper by Mr. Bull reproduced the old idea of dephosphorising by means of steam, but no very new facts appear to have been brought forward by the author. A useful method of compressing the tops of steel ingots by the direct action of high pressure on the surface of the molten metal, invented by Mr. H. R. Jones, of Pittsburg, Pennsylvania, was described by Mr. Davis. This appears to mark a real progress in the manipulation of the metal, as the proportion of unsound ingots is said to be notably reduced by its use. Of more general interest than the formal papers, however, was the statement made by Mr. Windsor Richards, on the progress achieved in the dephosphorising of Cleveland pig-iron in the Bessemer converter by the Thomas-Gilchrist-Snelus process since the last meeting, which Mr. Bell pronounced to be an absolute scientific success, steel rails produced by this method at Eston from Cleveland ore having satisfactorily passed the tests prescribed by the North-Eastern Railway Company. Several minor papers less intimately connected with the main objects of the Institution, such as the use of glass toughened by Siemens's process of annealing for tramway sleepers, the progress of iron and steel as constructive materials were also read during the meeting. The afternoons, in accordance with the usual custom, were devoted to excursions, the members being fortunate enough to have the three finest examples of the Transatlantic steamers belonging to the Cunard, Inman, and White Star Lines in port and available for their inspection at the same time. The Warrington Wire Works, the largest manufactory of the class in the country, the enormous locomotive engine, boiler, and steel works of the London and North Western Railway Company at Crewe, Messrs. MacCorquodale's Railway Printing Office, and several of the large collieries in the Wigan district were also inspected by the members on the remaining afternoon of this very successful meeting.

NOTES

THE Autumn Congress of the Sanitary Institute will be held at Croydon from the 21st to the 25th inst., under the presidency of Dr. B. W. Richardson. The exhibition will be opened at 3 P.M., on the 21st, and in the evening Dr. Richardson will give his presidential address. On the 22nd Dr. Alfred Carpenter will give the address in the Section of Sanitary Science and Preventive Medicine; on the 23rd Capt. Douglas Galton, in the Section of Engineering and Sanitary Construction; and in the evening Prof. Corfield will give a lecture to the Congress; on the 24th Mr. G. J. Symons will give the address in the Section of Meteorology and Geology. Saturday, the 25th, will be devoted to discussion. The results of the examinations conducted by the Institute having shown the necessity for some systematic plan of technical instruction in sanitary science, the Council have decided to establish a School of Hygiene in London, to be opened during the month of November next. The course of instruction will include the following subjects:—Preventive Medicine. Practical Sanitary Science—(a) Medical and Chemical; (b) Engineering and Constructive. Jurisprudence and Sanitary Law. The following

gentlemen have been appointed the first lecturers:—Preventive Medicine—Dr. B. W. Richardson, F.R.S.; Practical Sanitary Science: (a) Medical and Chemical—Prof. Corfield; (b) Engineering and Construction—Capt. Douglas Galton, R.E., C.B., F.R.S. Jurisprudence and Sanitary Law—Mr. W. H. Michael, Q.C., F.C.S. It is proposed that each session should occupy about twelve lectures, and the course will embrace the subjects included in the examinations of the Sanitary Institute of Great Britain and other examining bodies. The school will be open to all classes and to persons of either sex.

THE Social Science Congress was opened at Manchester yesterday, under the presidency of the Bishop of Manchester.

WE record with sincere regret the death of Mr. Henry Negretti, the well-known optician, and inventor of the deep-sea thermometer to which his name is attached. Mr. Negretti died on Wednesday last week at the age of sixty-two years. What his inventive genius did for the work of scientific research many of our readers know. His death is a real loss to science, as it will be to many who had substantial cause to know the depth of his generosity.

MR. R. J. USSHER, the explorer of the Pleistocene caves near Cappagh, Co. Waterford, has added to his discoveries a "submarine crannog." This is a new feature in reference to the Irish lake dwellings; for although some of them were known to be of very ancient date yet no trace of them had been recorded from the submerged bogs.

THE commemoration of the eighteenth centenary of the destruction of Pompeii—rather a strange event on which to hinge a celebration of any kind—appears to have been a great success. It attracted a large concourse of visitors, for whose delectation several excavations were made, and innumerable objects of great interest brought to light. One house excavated seems to have been a bird-seller's shop, judging from the small bones found, the little drinking vessels, and the quantities of millet and hemp seed, and what looked like small beans. The memorable feature of the commemoration, however, is the volume issued by the Directorate of the Museums of Naples. The eminent astronomer, Prof. Palmieri, contributes a paper on Vesuvius in the times of Strabo and Spartacus, and on the changes it underwent A.D. 79. The Chevalier Ruggiero discourses effectively on the eruption itself, and Signor Scacchi describes the houses demolished by lightning. The other fifteen contributions which complete the volume treat of every aspect of the public and private life of Pompeii.

THE second part of the magnificent "Herefordshire Pomona," brought out by the Woolhope Club, has been issued. We are pleased to hear that the work has been so successful that the club have resolved to increase the size of the part, so as to complete the work as soon as possible. To the present part Dr. Bull contributes a curious and interesting paper on "Modern Apple Lore," as also "A Sketch of the Life of Lord Scudamore," with a very fine large portrait; and Sir H. E. C. Scudamore Stanhope a paper "On the Cordon System of Growing Pears." The part contains many plates of exquisitely coloured illustrations of varieties of apples and pears.

THE Engineering Laboratory, in connection with the Technical Department of University College, was opened to students yesterday. A private view to representatives of the press was given on Tuesday afternoon. The faculties of Arts and Laws and of Science were opened yesterday by an Introductory address by Prof. Charles Graham on Technical Education.

IN a paper on Experimental Determination of the Velocity of Light, read at the Saratoga meeting of the American Association by Mr. A. A. Michelson, of the U.S. Navy, the author concludes as the result of an elaborate series of experiments, that the velocity of light *in vacuo* is 299,828 kilometres per second. See NATURE, vol. xviii. p. 195.

GENERAL MYER, the chief officer of the U.S. Signal Office, has issued the first number of a French edition of the meteorological observations taken at the several meteorological stations placed under his supervision.

M. ANGOT, Professor of Physics to the Lycée Fontanes, has been appointed meteorologist to the Central Bureau of Paris.

THE French Northern Railway Company posts up daily at its principal stations the warnings and weather maps, issued by the Central Bureau of Paris. The meteorological news of the principal sea-ports on the railway system of the Company are also noted.

A METEOROLOGICAL station, as we announced in our last impression, will be established at Mont de Mignons, in the vicinity of Nice. It should be added that an agronomical station will be placed in the same locality. The total expense is estimated at 40,000*l*.

THE special Museum of Algerian industrial and natural products, established in the Palais de l'Industrie twenty years ago, has been broken up. A part of it has been sent to the Museum of the French Colonies at the Ministry of Marine and Colonies, and the other to the Ethnographical Museum, which is being fitted up at the Trocadero.

IN a small pamphlet entitled "Notes from the History of my Parrot in Reference to the Nature of Language" (a reprint from the *Journal of Mental Science*) Dr. Samuel Wilks aims at proving that language, in its larger sense, has its rudimentary framework in the inferior creatures. The result of his observations as to the parrot's faculty of acquiring language are "that it has a vocal apparatus of a most perfect kind, that it can gather through its ear the most delicate intonations of the human voice, that it can imitate these perfectly by continued labour, and finally, hold them in its memory; also that it associates these words with certain persons who have uttered them; also that it can invent sounds corresponding to those which have emanated from certain objects."

THE terrific hurricane which passed over Brisbane and the suburbs on the night of June 23, unfortunately did some very serious damage in the Botanic Gardens and in the Acclimatisation Society's grounds. Numbers of large trees were torn up by the roots, and branches were scattered in all directions. At Bower Park numerous valuable trees and plants were injured, and it will take much time and labour to repair all the mischief.

THE *City Press* states that it is intended shortly to present the honorary freedom of the Leathersellers' Company to Prof. Owen.

BY the last mail from China we learn that there has been a severe earthquake in Western China, which is said to have caused serious damage in the provinces of Szechuen, Shensi, and Kansu. From Manila the intelligence also comes that Surigao has experienced several disastrous earthquakes which commenced on July 1. The shocks are described as even stronger than that felt there in 1875. Between July 1 and 13, beyond which latter date we have no news, no less than seventy shocks had been felt. The damage to houses had been considerable, but no lives had been lost.

MR. E. KNIPPING, of Yedo, has just published a *brochure* on the typhoons which occurred about a year ago in the China and Japan seas. Mr. Knipping has embodied in it the results of his own personal experience and information, derived from the logs of ships which were caught in the gales.

THE *Transactions* of the Norfolk and Norwich Society for 1878-9 contain, as usual, several papers of value. Mr. J. H. Gurney describes a visit he paid to "the Gannet City," as he calls the Bass Rock in the Firth of Forth. "Norfolk Decoys" is an interesting paper by Mr. T. Southwell, and Mr. John Cordeaux contributes "Some Recent Notes on the Avi-Fauna

of Lincolnshire," and Mr. H. B. Woodward a memoir of Samuel Woodward. Ornithological and Meteorological Notes for 1878, and Part 9 of the Fauna and Flora of Norfolk (Hymenoptera—Chrysidae and Aculeata) by Mr. J. P. Bridgman fill up the volume.

WE learn from the annual report of the Central Meteorological Observatory at St. Petersburg, just appeared in the *Repertorium für Meteorologie* for the years 1877 and 1878, that the Observatory received accurate meteorological observations from 133 Russian stations.

"ACCIDENTS in the Comstock Mines and their Relation to Deep Mining" forms the subject of a recent paper to the American Institute of Mining Engineers, by Mr. Church, M.E. He points out that heat, the peculiar mode of timbering in square sets, the almost exclusive use of nitro-glycerine powders, the necessity of frequent repairs to shaft timbers, the incessant movement of the rocks through which the shafts are sunk, making accidents in hoisting more than ordinarily frequent, and the necessity of transporting large quantities of rock through narrow gangways entirely by human labour, are the conditions in which mining in the Comstock may be said to suffer rather more than the usual liability to danger. Two of the causes, both connected with the movement of the ground, may be expected to increase with depth. Together with the heat they comprise 40 per cent. of the whole number of accidents. It is concluded that the conditions of deep mining will increase 40 per cent. of the causes which lead to casualties, leaving 60 per cent. unaffected.

THE silicates which form crystalline rocks (the formation of which is supposed to have occurred at a high temperature) allow of being fused in the laboratory, and the products of this fusion are of great geological interest. Not a few are chemically altered in the process, because they contain hydrogen or fluorine, or both. In a recent paper to the Berlin Academy Prof. Rammelsberg has discussed the behaviour of the two fluorine-containing silicates, topaz and mica, at a high temperature. It appears that out of both the fluorine is wholly or partly volatilised, escaping partly in the free state, partly in the form of fluorides. The two minerals, however, behave differently in that, whereas in the glowing mica the proportion of the electro-positive elements is not altered, in the glowing topaz a large quantity of silicon and a smaller of aluminium is wanting.

THE number of journals and reviews published in the twenty-two cantons of Switzerland is 519, of which 249 are political journals, 30 literary, 39 religious, &c. It is in the canton of Berne that most journals are published, viz., 71; then comes the canton of Zurich with 68; the cantons of Glarus and Uri have only 3 journals each.

A FRENCH populariser of science, Prof. Laurendeau, of Bordeaux, endeavours to give an idea of universal gravitation by using a terrestrial globe to which small figures are attached by means of pieces of caoutchouc. On pulling a figure from the globe, then letting go, it falls back wherever its position on the globe. Two such figures being attached on opposite sides of the globe, demonstrate that what we call high or low is merely greater or less distance from the centre of the globe. To illustrate the case of Saturn with its ring, Prof. Laurendeau uses a sphere rotated about a horizontal axis; in the equator of this sphere are arranged metallic sectors attached to the centre by threads of caoutchouc. On rotation commencing, the sectors come out, and by virtue of persistence of impressions on the retina, one sees Saturn's ring. Again, two balls of the same mass and volume are attached to suspended threads; the threads are twisted round each other, then left to untwist, whereupon the balls separate by centrifugal force, gravitating round a common centre between them. Then these balls are replaced

by a large ball and a small one; and this time the small gravitates round the large. Once more a solid lead ball and a large inflated balloon, being similarly treated, the larger gravitates round the smaller, &c.

DR. J. PELLETAN in an article on Microscopes in *La Nature*, states that English microscopes are much superior to those made in France; the former comply with all the desiderata, while the latter are far behind. But the English are at least twice the price of the French. Nearly all cheap English microscopes, Dr. Pelletan states, are bad.

WE have received the programme of the course of lectures during the coming winter in connection with the Bristol Museum and Library, in which scientific subjects bear a prominent part. During the Christmas holidays Prof. S. P. Thompson will give three lectures on Frost, Ice, and Snow, and Mr. W. J. Sollas on Glaciers, Ice Action in the Arctic Regions, and Ice Action in the Past.

"EDISON'S FAST SYSTEM OF TELEGRAPHY" is the subject of a descriptive paper in the October *Scribner* and the occasion of the publication of a new portrait of the inventor by Francis Lathrop. This system is the little known Automatic Telegraph which for a year was in operation between New York and Washington, and attained the marvellous speed of several thousand words per minute, but has now disappeared in the litigation of rival companies. *Scribner* has now had papers on the three discoveries of Mr. Edison, which are regarded by him as the most important, viz.: the Electro Motograph principle (involved in Phonograph, Telephone, &c.), the Carbon Button and the Automatic Telegraph.

IN the Paris International Exhibition of Sciences applied to Industry luminous dials for clocks are now sold, on which the hour can be read during the whole of the night without the help of any light whatever. Although fading gradually the phosphorescence is sufficient to serve till daylight. Barometers and thermometers are said to be prepared on this principle for night balloon ascents when no moon is visible. These substances are prepared according to the principle defined by M. Edmond Becquerel in his work on Phosphorescence.

M. H. LESOUDIER, of Paris, will shortly publish a large work on the natural history of birds, entitled "Les Oiseaux dans la Nature; Description pittoresque des Oiseaux utiles." The authors are MM. Raubert and Robert. The work will contain no less than sixty chromo-lithographs, and will besides be profusely illustrated with woodcuts.

THE Nagasaki *Rising Sun* states that the prospects of another new coal mine on an extensive scale being shortly opened in the Island of Nakanoshima are looked upon as very promising. Preliminary operations were commenced some time ago, and it is understood that they are now nearly completed. The Island of Nakanoshima is situated about twelve miles from Nagasaki, and contains some fine seams of coal.

IN his just published report on the trade and commerce of Taganrog, Her Majesty's Consul tells us that a scourge in the shape of a destructive insect—the *Amsoplia austriaca* beetle—has revisited that region. It appeared in the steppe, sixty miles to the north of Taganrog, as well as at Mariapol, in immense swarms, and committed great devastation among the corn crops. These insects attack the new corn, and have destroyed many million roubles' worth of produce. They deposit their eggs at a depth of from three to four inches in the ground, preferring rich dark soil where wheat is grown to any other, and it is stated that the lapse of one, or even two years is necessary to complete the metamorphosis. It is asserted that, after the larva has quickened, the offspring buries itself deeper in the ground until it arrives at maturity.

The following works of scientific interest will be published by Messrs. Macmillan and Co., during the coming season:—"A Treatise on Comparative Embryology," by Mr. F. M. Balfour, F.R.S.; the second part of the second volume of Professors Roscoe and Schorlemmer's "Treatise on Chemistry"; this, which is just ready, completes the "Inorganic Chemistry;" Prof. Boyd Dawkins' "Early Man in Britain"; Prof. Gamgee's "Text-Book of the Physiological Chemistry of the Animal Body;" "Pharmacology and Therapeutics" and "Natural History in the Bible," by Dr. Lauder Branton, F.R.S.; "A Manual of Geology," by Prof. Geikie, F.R.S.; "Structural Botany on the Basis of Morphology," by Prof. Asa Gray; "Blowpipe Analysis," from the German of J. Landauer, by Messrs. James Taylor and W. E. Kay; "Questions on Chemistry," by Mr. Francis Jones; "Easy Lessons on Heat," by Miss C. A. Martineau; "Easy Lessons on Light," by Mrs. F. E. Avdrey; "A Handbook of Double Stars," with a Catalogue of 1,200 Double Stars and Extensive Lists of Measures for the Use of Amateurs, by Edward Crossley, F.R.A.S., Joseph Gledhill, F.R.A.S., and James M. Wilson, F.R.A.S., with Illustrations; and a new and thoroughly revised edition of "Pharmacographia," by Messrs. Flückiger and Hanbury. Prof. Huxley's "Introductory" to the Science Primers, has already been announced.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. E. Meyerstein; a Black Rat (*Mus rattus*) from Rangoon, presented by Mr. R. M. Middleton; a Norwegian Lemming (*Myodes lemmus*) from Norway, presented by Mr. James Shuter, F.R.C.S.; a Bonelli's Eagle (*Nisaetus fasciatus*) from Mogador, presented by Capt. W. P. Forwood; a King Parrakeet (*Apornis scapularis*) from New South Wales, presented by General Blake; a White-backed Piping Crow (*Gymnorhina leuconota*) from South Australia, presented by Mrs. Buchanan; a Silky Marmoset (*Midas rosalia*) from Brazil, a Malbrouck Monkey (*Cercopithecus cynosurus*) from West Africa, deposited; a Red-billed Tree Duck (*Dendrocygna autumnalis*) from South America, purchased; a Brown Bear (*Ursus arctos*) from Russia, received in exchange.

MOUNT ETNA

SHORTLY after the eruption of Mount Etna in May and June last M. H. de Saussure visited the mountain, and made a minute exploration of the region about the sources of the eruption. The results of this examination he describes in a series of letters in the *Journal de Genève* from June 17 to July 4, copies of which M. de Saussure has sent us, along with a note containing additional observations. On his first ascent he and his guide had to spend the night on Monte Temperossa in rather critical circumstances and with the scantiest supply of food and drink. Indeed, it seems to have taken a day or two after reaching a supply of water below ere M. de Saussure's thirst could be quenched. He had observed large patches of a deep black attached to the rocks, and had been puzzled to know what they were. His thirst, however, quickened his perception, and on scratching away about a centimetre of ashes he found underneath what he had half expected, beautiful white snow. The failure of this first excursion determined M. de Saussure to choose another point of departure than Lingugrossa, and to devote three days if necessary to traverse the neighbourhood of the cone. He thus succeeded in reaching the upper limits of the eruption on the north side. The crevasse which has been opened on Etna has divided the volcano into two parts. On the north face it extends to the valley which bounds the mountain; on the south face it seems to be arrested half way. Some of the details of the eruption have already been given in NATURE, vol. xx. p. 198. On the north face the large crevasse gave out two considerable streams, superposed in the same fault. The upper stream began in the neighbourhood of the cone of Etna, and was arrested to the east of Monte Pernicio. Thence the crevasse is quite exposed, and gave out only eruption of gas. Below Monte Pizzello there is formed a cone of ashes which gave out no lava. From this point the crevasses continue

exposed to the ravine which separates Monte Nero from Monte Temperossa. Here are the sources and centres of the great lava stream which extend to near Mojo. M. de Saussure describes in detail the upper stream, which appears not to have been previously visited.

This eruption first appears at a height of about 2,700 metres, at the foot of the slopes of the upper plateau which supports the principal cone (Monte Morigibello). A violent explosion has here opened the side of the mountain, throwing out a mass of rocks, and forming a steep gulf in which the northern crevasse seems to terminate. Below this point of explosion the lava was thrown out in great abundance, and formed a current at first narrow, which afterwards inundated the slopes of a high plateau spreading over a distance of several kilometres. At the point of departure was formed a sugar-loaf cone of small height, which, on June 13, was still very active, and whence escaped with a hissing sound a thick smoke of vapours, mixed occasionally with great flames resulting from the combustion of gas. The lava was spread over a vast inclined plateau, flowing over very rough streams of recent lava, on which it is broken up to an infinite extent as far as the foot of a mountain with three craters (Monte Pernicio) which turns it to the east.

An important fact observed by M. de Saussure is that these lavas flowed over the snow, and that at the time of his visit even they rested on a thick bed of that substance. In fact, in all the faults of the lava, in all the openings, at the bottom of all the ravines resulting from the sinking of the lavas, snow was found, often several metres in thickness. Nothing proves better, M. de Saussure thinks, how bad a conductor of heat the eruptive matter is. The terminal end, as it rolls down, carpets the ground with blocks resulting from the continual rupture of the already solidified envelope, and thus forms a base on which afterwards flows the viscous current. At the same time a large mass of snow must have been melted. M. de Saussure saw traces of a large number of streams loaded with ashes which had been precipitated from all the rocks and washed the slopes of the snows, which extend much lower than the lava stream. One result of this eruption over snow is that the lava is mixed with a mass of mud, the melting snow diluting the dust resulting from the porphyrisation of the blocks at the same time as the shower of ashes from the great crater falls on the surface of the current. The fire and water ceaselessly intermingling by the mechanical action of the burning gravel, produced a sort of muddy marmalade, which, rapidly fusing by the persistent heat of the lavas, gave rise to clouds of vapour and left all the stream, all its blocks, all its pebbles, covered with a layer of dry mud, which turns into dust and gives to the new lavas a grey colour which prevents them from being distinguished at a distance from old lavas.

Below the upper lavas the slopes which extend in the direction of Monte Nero are covered with vast fields of hard and deep snow. Their surface is all strewn with yellow spots, so that at a distance they seem covered with sulphur. This appearance is due to the abundant efflorescence of ferrous chloride which condenses on the surface of the snow, and which has formed small mound-like masses, mixed to a small extent with agglutinated ashes. The whole of the snow is, moreover, covered with patches of hardened mud of the size of a plate, and even much larger, also ornamented with yellow efflorescence, and mostly cracked like dried mud or split from bottom to top by a push which has raised them and broken them into a star-like shape. M. de Saussure thinks that these singular accidents are due to deep emanations, and seem to show that under the snow the ground is riddled with crevasses in direct communication with the volcanic centre. The acid vapours reaching the lower surface of the snow are there condensed by the cold; but gradually they reach the surface, and have then formed an infinite number of small sources, which are charged with mud because the ashes of the old subjacent lavas have been diluted with water resulting from the condensation of vapour against the under surface of the snow, increased by the snow melted by the heat of these same vapours. After quitting the snows, an immense area of sand-hills is met with covered with blocks from the crater of Etna.

M. de Saussure paid a visit to the great cone of Etna in company with an English and an American tourist. As they were walking over the lower slopes of the cone of ashes, he observed a small crack in the fine sand which covered the ground. This soon ceased to be visible, and suddenly M. de Saussure saw a much larger crevasse open under his feet, and he felt at the same time the ground begin to glide down the steep slope. He fled